

Internet Protocols



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Preface

My desired area in network field is network protocols. I fascinated the way, how came IPv6. Here is what I found about that topic from the internet.

What is protocol?

A protocol is a standard used to define a method of exchanging data over a computer network such as local area network , Internet, Intranet, etc.

Each protocol has its own method of how data is formatted, when sent and what to do with it once receive, how that data is compressed or how to check for errors in data.

What is Internet Protocol (IP)?

IP is an address of a computer or other network device on a network using IP or TCP/IP.

For example, the number "166.70.10.23" is an example of such an address. These addresses are similar to an addresses used on a house and is what allows data to reach the appropriate destination on a network.

First some history

Right now, Internet Protocol version four (IPv4) is the dominant Internet protocol. Meaning IPv4 is the common digital electronic language our computers use to communicate on the Internet. IPv4 is a data-oriented protocol that's specific to packet switched networks (e.g., Ethernet).

It's a best-effort protocol, meaning there's no guarantee of delivery or correctness of the data. That's handled by Transmission Control Protocol (TCP), which is defined along with IP in the Internet Protocol Suite.

In simple terms, TCP and IP are the Internet protocols that do the same thing as snail mail addressing.

Why IPv6?

Initially, IPv6 was developed simply because there aren't enough addresses(IP addresses to be exact) available using IPv4. If you are interested, the exact number of IP addresses using IPv4 is 2 to the power of 32, or 4,294,967,296.

That may seem like a bunch, but most experts agree that the amount of IP addresses available in IPv4 will run out by 2010.

That prediction is partially based on the fact that there are 6.7 billion (6,720,539,678) people inhabiting our planet right now, and a large percentage of them will be needing at least one IP address.

In comparison, IPv6 has 2 to the power of 128, or 340,282,366,920,938,463,463,374,607,431,768,211,456 available IP addresses.

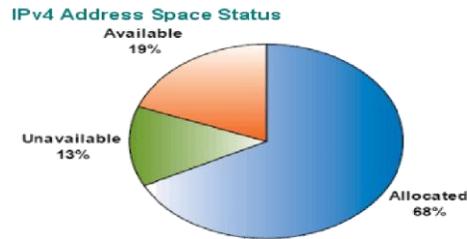
To gain a perspective on that, IPv6 allows each of the 6.7 billion people alive today the option of having 2 to the power of 95, or 39,614,081,257,132,168,796,771,975,168 IP addresses.

IPv4 vs IPv6

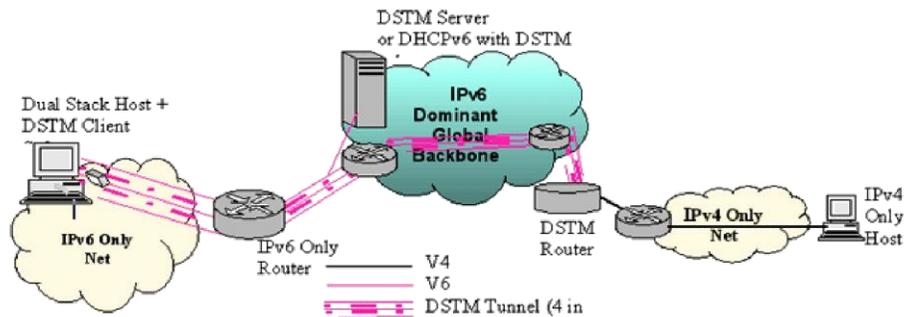
	Internet Protocol version 4 (IPv4)	Internet Protocol version 6 (IPv6)
Deployed	1981	1999
Address Size	32-bit number	128-bit number
Address Format	Dotted Decimal Notation: 192.149.252.76	Hexadecimal Notation: 3FFE:F200:0234:AB00: 0123:4567:8901:ABCD
Number of Addresses	2 to the power 32 = ~4,294,967,296	2 to the power 128 = ~340,282,366, 920,938,463,463,374, 607,431,768,211,456

Features that make IPv6 'greater' than IPv4

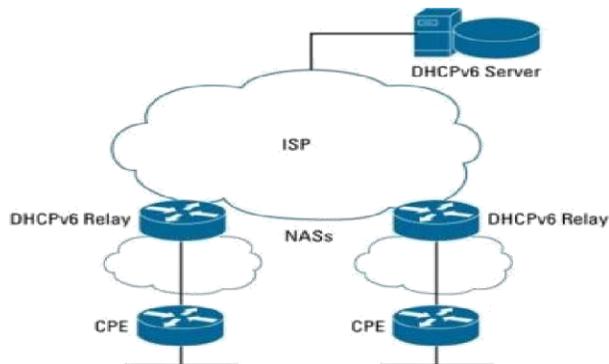
1) IPv6 provides a substantially larger IP address space than IPv4



2) IPv6 provides better end-to-end connectivity than IPv4



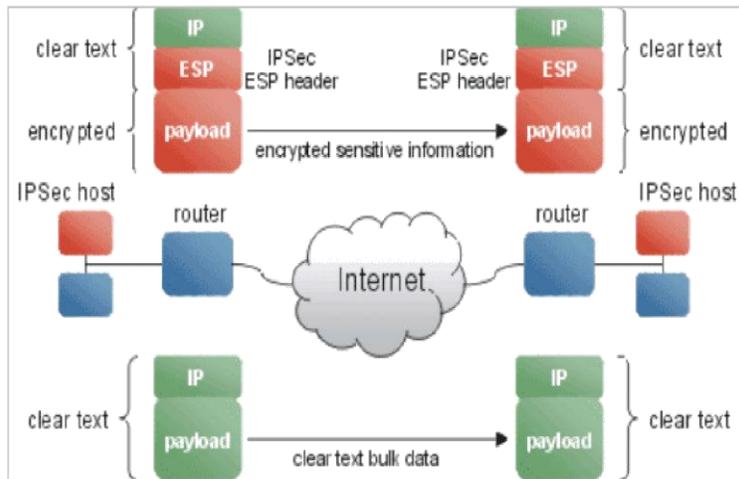
3) IPv6 has better ability for auto configuring devices than IPv4



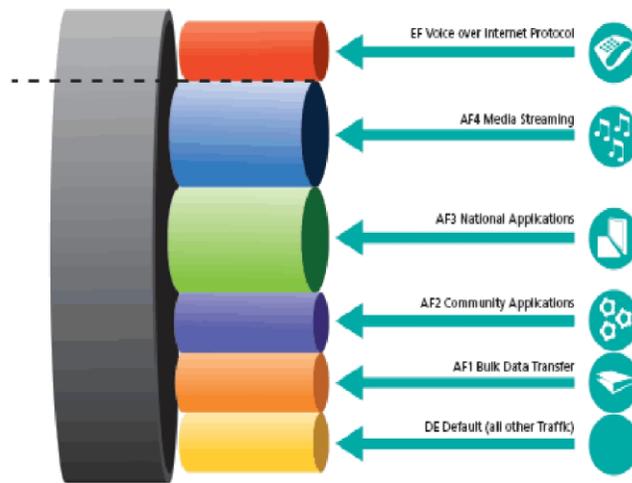
4) IPv6 contains simplified Header Structures leading to faster routing as compared to IPv4

Version	Traffic Class	Flow Label	
Payload Length		Next Header	Hop Limit
Source Address			
Destination Address			

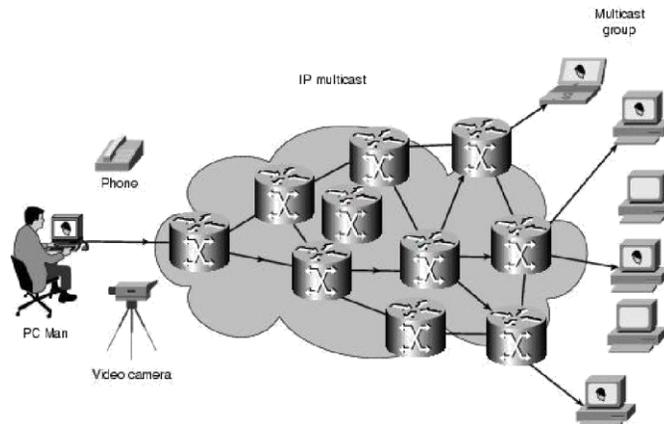
5) IPv6 provides better security than IPv4 for applications and networks



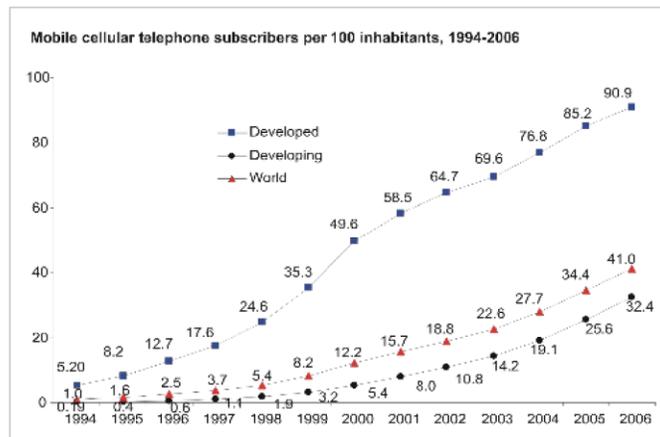
6) IPv6 gives better Quality of Service (QoS) than IPv4



7) IPv6 provides better Multicast and Any cast abilities compared to IPv4

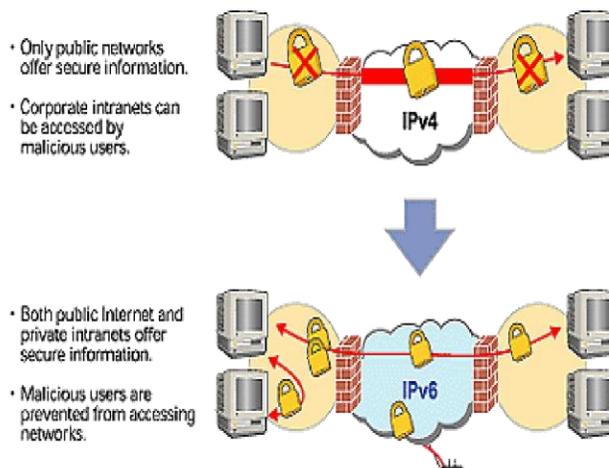


8) IPv6 offers better mobility features than IPv4



Source: ITU World Telecommunication/ICT Indicators Database

9) IPv6 offers ease of administration over IPv4



10) IPv6 follows the key design principles of IPv4, thereby permitting a smooth transition from IPv4.

